

### REMARKS

Claims 1, 4, 7-9 and 12 are pending. Claim 1 is an independent claim and the remaining claims depend directly or indirectly from claim 1. No amendments are presented.

Claims 1, 4, 7-9 and 12 are rejected under 35 U.S.C. §102(b) as being anticipated by Skala et al. (US 6,132,689). Applicants traverse the rejection to the extent that it can be maintained.

As a preliminary matter, the grant date of US 6,132,689 is October 17, 2000 which is later than the filing date of February 18, 2000 of the present application. Therefore, US 6,132,689 does not qualify as prior art under 35 U.S.C. §102(b). Nevertheless, even if US 6,132,689 were valid prior art, a point that Applicants do not concede, it does not anticipate the claimed invention.

Applicants claim a CO removing device that provides improved selectivity in removal of CO, i.e. less undesirable side reaction, and a simpler structure for the device than prior art devices. Hydrogen gas containing CO is **passed through** a selective oxidative **catalyst bed** (SOCB) contained within a gas passing tube. It is difficult to control the temperature of the SOCB across the width of the bed. The temperature of the portion of the bed adjacent the walls of the gas passing tube containing the bed tends to be relatively low while temperature of the bed toward the middle of the gas passing tube tends to be relatively high. Applicants discovered that by cooling an upstream portion of the SOCB so that the central part of the bed is in the desired temperature range, then blending gas from a part adjacent the walls with the gas from a central part of the bed before passing the gas into a downstream portion of the bed that is not cooled, a high selectivity of CO removal is achieved. Blending is accomplished by a gas blending unit **within** the catalyst bed. The gas blending unit within the SOCB projects inward from the inner surface of a gas passing tube that contains the SOCB so as to partially obstruct the gas passing tube. A cooling mechanism is disposed upstream of the gas blending unit. The structure provides the improved selectivity in removal of CO.

Although US '689 discloses a reactor for removing CO from a gas, the structure disclosed by US '689 is completely different from the structure claimed by the Applicants.

The Office Action begins by equating a catalyst bed as claimed with a catalyst layer as disclosed by US '689. A catalyst bed and a catalyst layer are structurally different and perform their respective functions differently. The claimed invention passes gas for treatment **through** the catalyst bed while the device disclosed by US '689 passes gas **over** the surface of a catalyst layer (column 4 line 67 to column 5 line 8). There is no structure disclosed in US '689 wherein the flow of gas through its CO remover passes through a catalyst bed. This structural difference alone precludes a conclusion of anticipation of the claimed invention by US '689.

The Office Action goes on to allege that the reactor **2** disclosed by US '689 anticipates the claimed gas passing **tube**. Figure 1 of US '689 presents a cross section view of the reactor **2** from which no conclusion can be stated with respect to the three dimensional shape of the reactor **2**. The common understanding of the meaning of "tube" is that it is an elongated, cylindrical structure (Merriam-Webster Online Dictionary). No elongated, cylindrical reactor is disclosed by US '689. Figures 2, 5 and 6 of US '689 show alternate embodiments of its reactor -- none of which are tubes. The shape of the reactor **2** disclosed by US '689 does not anticipate the claimed gas passing tube.

The Office Action further alleges that the partition **8** disclosed by US '689 is a gas blending unit. The partitions **8** simply are dividers separating discrete heat exchangers arranged side by side in a common housing (column 4 lines 50 to 53). The structures of the partitions **8** are independent of any cooperation with the catalyst layers. These partitions are no more than walls directing gas flow from one set of heat exchangers to the next. There is no disclosure that the partitions provide or are capable of providing gas blending. In fact, US '689 discloses that chambers **30**, that are external to the catalyst coated cooling channels **16**, substantially homogenize (blend) gas passing from one heat exchanger to the next (column 5 lines 24 to 33). The partitions **8** do not anticipate the claimed gas blending unit that projects inward from the inner surface of the gas passing tube and is within the catalyst bed.

Note also, contrary to the description of the blending function in the Office Action, gas does not pass through the catalyst layers disclosed by US '689. Gas passes over the catalyst layers in a laminar flow condition contacting the surface of the catalyst layer (column 5 lines 3 to 8).

Although the mixing chamber **30** may function as a blending unit as alleged in the Office Action, the mixing chamber **30** is not within a catalyst bed (column 5 lines 23 to 29). The mixing chamber **30** fails to disclose a blending unit within a catalyst bed and therefore does not anticipate the claimed structure.

Further, the Office Action alleges that the partitions **8** partially obstruct the reactor referring to Figure 1. This is true to the extent that the partitions **8** guide gas from one set of heat exchangers to the next. However, as explained above, the partitions **8** are not within the catalyst bed and provide no blending function. The partition **8** does not anticipate the claimed gas blending unit.

The Office Action fails to identify any structure in US '689 corresponding to the "double-walled cylinder with an annular clearance formed therebetween" recited in claim 1 to enable a cooling function. The cooling channels **16** disclosed by US '689 are not "double-walled" cylinders and do not provide cooling to a catalyst bed as described at page 7, line 25 to page 8, line 15 of the application. US '689 does not disclose any structure that anticipates the claimed the "double-walled cylinder" structure.

With respect to the dependent claims, since they depend directly or indirectly from claim 1 (that is allowable for the reasons stated), these claims likewise are allowable. Nevertheless, the following comments are offered to further distinguish these claims from US '689.

With respect to claims 7 and 9, the partitions **8** contact a portion of the inner surface of the reactor **2**, but clearly are not disposed around the inner surface of the reactor **2**. Figure 1 shows a gap between the partitions **8** and the wall of the reactor that is necessary to permit flow of gas from one set of heat exchangers to the next. The Office Action refers to the disclosure at column 9 lines 36 to 40 for the proposition that the partitions **8** can be a turbulator. However, the

passage cited in the Office Action refers to mixing chambers **30** and not the partitions **8**. Since the mixing chambers **30** and the partitions **8** are not within the catalyst bed, and since neither the mixing chambers **30** nor the partitions **8** are circularly disposed around the inner surface of a gas passing tube, claims 7 and 9 are not anticipated by US '689.

With respect to claim 8, it is sufficient to note that partitions **8** are not within a catalyst bed and therefore are not a gas blending unit as claimed.

The Office Action alleges that US '689 teaches a length between a start of the selective oxidative catalyst bed in a direction of a flow of the mixed gas and the gas blending unit is no shorter than 1/3 of a length between the start of the selective oxidative catalyst bed and an end of the selective oxidative catalyst bed in the direction of the flow of the mixed gas, referring to Figure 1 of US '689. First, the catalyst layers disclosed by US '689 are not a catalyst bed as claimed. More importantly, figures in a patent are to illustrate the claimed invention, and are not engineering drawings. Unless dimensions are expressly recited in the reference, no dimensions can be implied from the figures. Claim 12 is not anticipated by Figure 1.

Applicants respectfully submit that claims 1, 4, 7-9 and 12 are not anticipated by US '689 and request that the rejections be withdrawn.

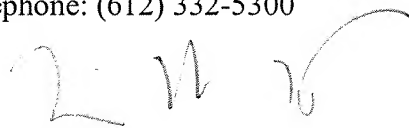
In view of the above remarks, Applicants respectfully request a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Respectfully submitted,

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12 January 2007  
Date



  
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